The Nucleolus

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Edited by E.G. Jordan and C.A. Cullis

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This volume of the SEB Seminar series represents part of the 200th meeting of the SEB, held in Oxford, during December, 1980. As might be expected of a record of conference proceedings, this volume makes no claim to be wholly comprehensive, but it nevertheless makes a valuable contribution to the literature on the nucleolus.

Current work in this area may be divided into three main areas, ultra-structure, genetics and biochemistry, and all are well represented. Since the work particularly of Fischberg, Brown, Gurdon, Birnstiel and Wallace from the late-1950s to the mid-1960s the essential relationship between the nucleolus and the genes encoding rRNA has been clearly established (although one set of authors in this book quotes only their own work in 1971 as having established this relationship!). Thus there is a correlation between the number and size of nucleoli and the way that the complement of ribosomal genes is distributed at different loci in the chromosomes. The control of the activity of these loci, known as 'nucleolus organisers', by other genes is the subject of an interesting review by Flavell and Martini. The other paper concerned with genetics is by Cullis, and is concerned with situations where rDNA content varies from generation to generation. In *Drosophila* the phenomena are called rDNA compensation and rDNA magnification, and it also occurs in flax grown under different conditions. In no case is the molecular mechanism really understood. Conceptually related to these phenomena is the amplification of ribosomal genes in germ cells, particularly the oocytes of many animals. The way this fits into the biology of a variety of animals is reviewed in a thoughtful and fascinating article by MacGregor.

The best understood aspect of nucleolus function is the detailed mechanism of transcription of the rRNA genes. This is covered, in part, by the article of Moss and Birnstiel, who review the structure of the non-transcribed spacer of the *Xenopus laevis* ribosomal gene repeat unit and then describe some ingenious experiments on its function. It is unfortunate that much information on the initiation and termination of transcription of rRNA transcripts has appeared between the conference and the publication of the book. For such a topical subject a delay of 18 months seems hard to justify. There is also a valuable account of the sequence of rRNA and its methylation by Maden, Hall and Salin. As in the paper of Moss and Birnstiel, some of the most useful nucleic acid sequences are reproduced at such a small scale that it is hard to read them without a magnifying glass!

Several papers are concerned with the third aspect of the nucleolus, its ultrastructure, and the way that this changes through the cell cycle (De La Torne and Giménez-Martin; Bouteille et al.). There are also two papers by Scheer, Busch and their associates which describe attempts to fit structure to molecular composition. In this section it is unfortunate that with so many micrographs the photographic reproduction is not of the highest quality.

Despite its faults this volume covers enormous ground and can be heartily recommended to anyone wanting a reasonably current assessment of the structure and function of the nucleolus.

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